Subject: Re: Does IDL has histogram matching function?
Posted by David Fanning on Fri, 08 Nov 2002 17:35:46 GMT
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David Fanning (david@dfanning.com) writes:

> I expect it might take a day or so to write the code.
> Do you have any money? :-)

Ah, forget the money. This turned out to be too easy. :-)

Here is a routine, named HISTOMATCH, that takes an image
and a histogram that you would like to perform histogram
matching to.

```
;*******************************************************
FUNCTION HistoMatch, image, histogram_to_match

; Perform histogram matching according to the method of
; Gonzales and Woods in Digital Image Processing, pp 94-102

; image - The input image.
; histogram_to_match - The histogram used for histogram matching.

   ; Calculate the histogram of the input image.

h = Histogram(Byte(image), Binsize=1, Min=0, Max=255)
totalPixels = Float(N_Elements(image))

   ; Find a mapping from the input pixels to s.

s = FltArr(256)
FOR k=0,255 DO BEGIN
  s[k] = Total(h(0:k) / totalPixels)
ENDFOR

   ; Find a mapping from input histogram to v.

v = FltArr(256)
FOR q=0,255 DO BEGIN
  v[q] = Total(histogram_to_match(0:q) / totalPixels)
ENDFOR

   ; Find z from v and s.

z = BytArr(256)
FOR j=0,255 DO BEGIN
   I = Where(v LT s[j], count)
```

```
   IF count GT 0 THEN z[j] = (Reverse(I))[0] ELSE z[j]=0
ENDFOR

   ; Create the matched image.

matchedImage = z[Byte(image)]
RETURN, matchedImage
END
;*******************************************************
```

I'm certain JD or someone will point out to me how to
use another Histogram to eliminate the Where function,
but, hey, this is for free. I'm trying to make a living
here. :-(

Does it work!? I think so. I'm not sure.

Try this. Let's see if we can match am image to the
histogram formed by calculating the histogram of
the histogram equalized image. (The result should
be the same as the histogram equalized image, more
or less.)

```
;*******************************************************
PRO TestIt
filename = Filepath('ctscan.dat', Subdir=['examples', 'data'])
OpenR, lun, filename, /Get_Lun
image = BytArr(256, 256)
ReadU, lun, image
Free_Lun, lun

Window, XSize=3*256, YSize=256
TV, image, 0
TV, Hist_Equal(image), 1
TV, HistoMatch(image, Histogram(Hist_Equal(image), Min=0, Max=255)), 2
END
;*******************************************************

   IDL> TestIt
```

Wow! And this was on the *first* try. *That* doesn't happen too
often. :-)

Try this:

```
   a = LonGen(255)
   b = a#b
   b = BytScl(b)
```

```
Window, 1
Plot, Histogram(b, Min=0, Max=255)
Window, 2, XSize=256, YSize=256)
TV, HistoMatch(image, Histogram(b, Min=0, Max=255))
```

Still looks good, I think.

OK, I'm waiting for feedback. :-)

Cheers,

David

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